Claims

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1. A laser device comprising: an n-doped cladding region and a p-doped cladding region; an optical guiding region disposed between the n-doped cladding region and the p-doped cladding region; and an active region disposed within the optical guiding region;

wherein the laser device further comprises at least one optical confinement layer disposed between the active region and at least one of the cladding regions, the at least one optical confinement region having a lower refractive index than the at least one of the cladding regions, and

wherein the laser device emits light in the visible region.

2. A laser device as claimed in claim 1 wherein the at least one optical confinement layer is disposed at the interface between the optical guiding region and one of the cladding regions.

3. A laser device as claimed in claim 2 wherein the Γ-conduction band of the part of the one cladding region immediately adjacent the at least one optical confinement layer is substantially degenerate with the X-conduction band of the at least one optical confinement layer.

4. A laser device as claimed in claim 1, wherein at least of the one cladding region has a graded bandgap.

5. A laser device as claimed in claim 1, wherein the composition of the one cladding region is selected such that the energy of the DX level in the one cladding region is greater than the Fermi level in the one cladding region.

6. A laser device as claimed in claim 2 wherein the DX level in the part of the at least one cladding region adjacent the at least one optical confinement layer is substantially degenerate with the X-conduction band in the optical confinement layer.

7. A laser device as claimed in claim 1, wherein the energy of the DX level in the one cladding region increases away from the at least one optical confinement layer.

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8. A laser device as claimed in claim 1, wherein the at least one optical confinement layer is disposed on the p-side of the laser device and is p-doped.

9. A laser device as claimed in claim 1, further comprising a second optical confinement layer disposed between the active region and the other of the cladding regions.

10. A laser device as claimed in claim 9 wherein the second optical confinement layer is disposed at the interface between the optical guiding region and the other of the cladding regions.

11. A laser device as claimed in claim 1, fabricated in the (Al,Ga,In)P system, with the one cladding region being formed of AlGaInP having an aluminum mole fraction y.

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12. A laser device as claimed in claim 11 where y decreases away from the at least one optical confinement layer.

13. A laser device as claimed in claim 11, wherein the at least one optical confinement layer is an AlGaInP layer having a greater aluminum mole fraction than the respective cladding region.

14. A laser device as claimed in claim 11, wherein the at least one optical confinement layer is an AlInP layer.

15. A laser device as claimed in claim 14, wherein the at least one optical confinement layer consists of oxidised AlInP.

16. A laser device as claimed in claim 11, wherein y is approximately 0.4 at the interface between the one cladding region and the at least one optical confinement layer.

17. A laser device as claimed in claim 11, wherein y is approximately 0.9 at the interface between the one cladding region and the optical confinement layer.

18. A laser device as claimed in claim 1, wherein the thicknesses of the optical guiding region and the or each optical confinement layer are selected such that the laser device emits, in use, light having a substantially circular far-field profile.

19. A semiconductor laser device comprising an n-doped cladding region and a p-doped cladding region; an optical guiding region disposed between the n-doped cladding region and the p-doped cladding region; and an active region disposed within the optical guiding region; wherein the composition of the n-type cladding region is selected such that the energy of the DX level in the n-type cladding region is greater than the Fermi level in the n-type cladding region.

20. A laser device as claimed in claim 19 wherein the n-type cladding region has a direct bandgap.

21. A laser device as claimed in claim 19 wherein the laser device is fabricated in the (Al,Ga,In)P alloy system and

the n-type cladding region is formed of AlGaInP having an aluminum mole fraction y where y < 0.55.

22. A semiconductor laser device comprising: an n-doped cladding region and a p-doped cladding region; an optical guiding region disposed between the n-doped cladding region and the p-doped cladding region; and an active region disposed within the optical guiding region; wherein the energy of the DX level in one of the cladding regions increases away from the optical guiding region.

23. A laser device as claimed in claim 22 and fabricated in the (Al,Ga,In)P alloy system, wherein the one cladding region is formed of AlGaInP having an aluminum mole fraction y, and wherein y decreases away from the optical guiding region.

24. A laser device as claimed in claim 1, wherein the light is in the range from about 630 nm to about 680 nm.

25. A laser device as claimed in claim 1, wherein the light is in the range from about 635 nm to about 650 nm.

26. A laser device as claimed in claim 1, wherein the laser device has a symmetrical structure.

27. A laser device as claimed in claim 26, wherein the laser device has a circular or elliptical far-field profile.

28. A laser device as claimed in claim 26, wherein the laser device comprises two optical guiding regions having the same thickness.

29. A laser device as claimed in claim 26, wherein the laser device comprises two optical guiding regions having the same composition.

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